

REMARKS

Applicant respectfully requests further examination and reconsideration in view of the above amendments. Claims 1-10 remain pending in the case. Claims 1-10 are rejected. Claims 1, 5, 7 and 8 are amended herein. No new matter has been added.

35 U.S.C. §102(b) – Claims 1, 4 and 6

Claims 1, 4 and 6 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,972,894 by Bjarklev et al. (referred to hereinafter as “Bjarklev”). Applicant has reviewed the cited reference and respectfully submits that the embodiments of the present invention as recited in Claims 1, 4 and 6 are not anticipated by Bjarklev for at least the following rationale.

Applicant respectfully directs the Examiner to independent Claim 1 that recites that an embodiment of the present invention is directed to (emphasis added):

An optical wave-guide absorption cell, comprising:
a first wave-guide;
a holey wave-guide filled with a known selective absorption medium, wherein a first terminus of said holey wave-guide is coupled to a first terminus of said first wave-guide, said holey wave-guide comprising:
a primary core;
a secondary core surrounding said primary core and comprising a plurality of voids filled with said known selective absorption medium; and
a cladding region surrounding said secondary core, wherein said cladding region has a lower index of refraction than said primary core and said secondary core; and
a second wave-guide, wherein a first terminus of said second wave-guide is coupled to a second terminus of said holey wave-guide.

Claims 4 and 6 that depend from independent Claim 1 also recite these limitations.

MPEP §2131 provides:

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). ... "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim.

First, Applicant respectfully notes that it is impermissible to rely on multiple embodiments of a reference in supporting an anticipation rejection. In particular, Applicant submits that relying on multiple embodiments of a reference does not disclose each element of the claimed invention "arranged as in the claims" as required.

In the current Office Action (mailed September 6, 2006), the Examiner states that "Bjarklev discloses in Figs. 1, 2, 4, 5 and 9 and optical waveguide absorption cell" (see page 2). Applicant respectfully submits that Figures 1, 2, 4 and 5 of Bjarklev each show an example of a different micro-structured waveguide/fibre. Accordingly, Applicant respectfully submits that the rejection of Claim 4 is improper, as the Examiner relies on the teachings of both Figure 1 and Figure 4 in supporting the anticipation rejection of Claim 4. In other words, Applicant respectfully asserts that the Examiner has improperly combined different embodiments of Bjarklev, and that anticipation of such a combination is not supported by Bjarklev.

Second, Applicant respectfully submits that Bjarklev is very different from the claimed embodiments. Applicant respectfully submits that Bjarklev does not teach, describe or suggest "a cladding region surrounding said secondary core, wherein said cladding region has a lower index of refraction than said primary core and said secondary core" (emphasis added) as claimed. Applicant understands Bjarklev to teach a wavelength converting waveguide device in which a core defect has an index of

refraction lower than the surrounding cladding. With reference to Figure 4, Bjarklev specifically recites that “the fundamental operation of the device is that the core defect (which has an average index below that of the fundamental space filling mode of the cladding) is modified by an increase of the refractive index of the features containing non-linear material” (emphasis added; col. 15, lines 12-17). In particular, Applicant respectfully submits that the core defect of Bjarklev has a refractive index lower than surrounding cladding.

In contrast, embodiments of the present invention provide “a cladding region surrounding said secondary core, wherein said cladding region has a lower index of refraction than said primary core and said secondary core” (emphasis added) as claimed. Applicant respectfully submits that Bjarklev does not teach, describe or suggest the claimed embodiments. As described above, Applicant submits that Bjarklev teaches that the core of a wavelength converting waveguide device has an index of refraction lower than the surrounding cladding.

As described above, the reference must disclose each element of the claimed invention, and must be “arranged as in the claims” to support an anticipation rejection. Applicant respectfully submits that Bjarklev does not teach, describe or suggest “a cladding region surrounding said secondary core, wherein said cladding region has a lower index of refraction than said primary core and said secondary core” as claimed. Furthermore, the Examiner relies on a combination of different embodiments of Bjarklev as teaching different claim limitations. Applicant respectfully asserts that relying on the teachings of the different embodiments of Bjarklev is improper, as the combination does not disclose each element “as arranged in the claims.” Therefore, Applicant respectfully

asserts that the rejection of Claims 1, 4 and 6 under 35 U.S.C. § 102(b) is not proper, and that Claims 1, 4 and 6 thus overcome the rejection under 35 U.S.C. § 102(b).

35 U.S.C. §103(a) – Claims 2 and 3

Claims 2 and 3 are rejected under 35 U.S.C. §103(a) as being unpatentable over Bjarklev in view of U.S. Patent No. 6,631,234 by Russell et al. (referred to hereinafter as “Russell”). Applicant respectfully submits that embodiments of the present invention are neither taught nor suggested by Bjarklev or Russell, alone or in combination, for at least the following rationale.

As described above in the remarks discussing the rejection Claims 1,4 and 6, Applicant respectfully submits that Bjarklev does not teach, describe or suggest “a cladding region surrounding said secondary core, wherein said cladding region has a lower index of refraction than said primary core and said secondary core” (emphasis added) as claimed. Applicant understands Bjarklev to teach a wavelength converting waveguide device in which a core defect has an index of refraction lower than the surrounding cladding. With reference to Figure 4, Bjarklev specifically recites that “the fundamental operation of the device is that the core defect (which has an average index below that of the fundamental space filling mode of the cladding) is modified by an increase of the refractive index of the features containing non-linear material” (emphasis added; col. 15, lines 12-17). In particular, Applicant respectfully submits that the core defect of Bjarklev has a refractive index lower than surrounding cladding. Furthermore, by teaching that the core defect has a lower refractive index than the surrounding cladding, Bjarklev teaches away from “wherein said cladding region has a lower index of refraction than said primary core and said secondary core” (emphasis added) as claimed.

Moreover, Applicant respectfully submits that the combination of Bjarklev and Russell fails to teach or suggest the present invention as claimed because the combination of Bjarklev and Russell does not satisfy the requirements of a *prima facie* case of obviousness. In order to establish a *prima facie* case of obviousness, the prior art must suggest the desirability of the claimed invention (MPEP 2142). In particular, “[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006)” (MPEP 2143.01). Applicant respectfully notes that “[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention” (emphasis in original; MPEP 2131.02; *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984)).

Applicant respectfully submits that there is no motivation or suggestion to combine the teachings of Bjarklev and Russell. As described above, Applicant understands Bjarklev to disclose a wavelength converting waveguide device in which a core defect has an index of refraction lower than the surrounding cladding. In particular, with reference to Figure 4, Bjarklev specifically recites that “the fundamental operation of the device is that the core defect (which has an average index below that of the fundamental space filling mode of the cladding) is modified by an increase of the refractive index of the features containing non-linear material” (emphasis added; col. 15, lines 12-17).

In contrast, Applicant understands Russell to teach photonic crystal fibers made of transparent material in which “[t]he transparent material in one part (usually the middle) of the cross-section has a higher refractive index than the rest and forms an optical core within which light is guided by total internal reflection” (col. 1, lines 10-13). In particular, Applicant respectfully submits that by teaching that the core defect has a lower refractive index than the surrounding cladding, Bjarklev teaches away from combination with Russell. Therefore, Applicant respectfully submits that there is no motivation or suggestion to combine the teachings of Bjarklev and Russell, and that the combination of Bjarklev and Russell does not satisfy the requirements of a *prima facie* case of obviousness

Applicant respectfully asserts that nowhere does the combination of Bjarklev and Russell teach, disclose or suggest the present invention as recited in independent Claim 1, that this claim overcomes the rejection under 35 U.S.C. § 103(a), and is thus in condition for allowance. Moreover, Applicant respectfully submits that the combination of Bjarklev and Russell does not satisfy the requirements of a *prima facie* case of obviousness. Applicant respectfully submits the combination of Bjarklev and Russell also does not teach or suggest the additional claimed features of the embodiment of the present invention as recited in Claims 2 and 3 that depend on independent Claim 1. Therefore, Applicant respectfully submits that Claims 2 and 3 overcome the rejection under 35 U.S.C. § 103(a), and that this claim is thus in a condition for allowance.

35 U.S.C. §103(a) – Claims 5 and 7-10

Claims 5 and 7-10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Bjarklev in view of U.S. Patent No. 6,496,634 by Levenson et al. (referred to hereinafter as “Levenson”). Applicant respectfully submits that embodiments of the

present invention are neither taught nor suggested by Bjarklev or Levenson, alone or in combination, for at least the following rationale.

First, as described above in the remarks discussing the rejection Claims 1,4 and 6, Applicant respectfully submits that Bjarklev does not teach, describe or suggest “a cladding region surrounding said secondary core, wherein said cladding region has a lower index of refraction than said primary core and said secondary core” (emphasis added) as recited in Claim 1. Applicant respectfully notes that Claim 7 recites the same limitation.

Applicant understands Bjarklev to teach a wavelength converting waveguide device in which a core defect has an index of refraction lower than the surrounding cladding. With reference to Figure 4, Bjarklev specifically recites that “the fundamental operation of the device is that the core defect (which has an average index below that of the fundamental space filling mode of the cladding) is modified by an increase of the refractive index of the features containing non-linear material” (emphasis added; col. 15, lines 12-17). In particular, Applicant respectfully submits that the core defect of Bjarklev has a refractive index lower than surrounding cladding. Furthermore, by teaching that the core defect has a lower refractive index than the surrounding cladding, Bjarklev teaches away from “wherein said cladding region has a lower index of refraction than said primary core and said secondary core” (emphasis added) as claimed.

Second, as stated by the Examiner, “Bjarklev does not disclose the holey waveguide further comprises a fill hole formed in the core, wherein the fill hole is an

opening in the core that is not at the first terminus of the holey waveguide and is not at the second terminus of the holey wave-guide, the fill hole adapted to introduce the known selective absorption medium into the plurality of voids” (see page 6, Office Action mailed September 6, 2006). The Examiner relies on Levenson as providing such a teaching.

Applicant respectfully submits that Levenson does not teach, describe or suggest “wherein said holey wave-guide further comprises a fill hole formed in said fiber optic absorption cell, wherein said fill hole is an opening into said plurality of voids that is not at said first terminus of said holey wave-guide and is not at said second terminus of said holey wave-guide, said fill hole adapted to introduce said known selective absorption medium into said plurality of voids” (emphasis added) as recited in Claim 5. Claims 7 and 8 recite similar limitations.

Applicant understands Levenson to teach a holey fiber in which an opening is formed at an end of the fiber for drawing liquid into the fiber. Levenson specifically recites that “[a]fter drawing, the ends of the fibers may be cut and the gas in the tube may be withdrawn by vacuum action. Then the fiber may immersed in a gas of the appropriate pressure or a liquid. Capillary action will draw the liquid into the hole in the tube and fill the fiber with the non-linear liquid” (emphasis added; col. 4, lines 1-6). Applicant respectfully submits that the ends of Levenson are termini as claimed. In particular, Applicant respectfully submit that if the ends of the fiber are not termini, capillary action would not be effective in filling the fiber with liquid.

Therefore, Applicant respectfully submits that that Levenson does not teach, describe or suggest “wherein said holey wave-guide further comprises a fill hole formed in said fiber optic absorption cell, wherein said fill hole is an opening into said plurality of voids that is not at said first terminus of said holey wave-guide and is not at said second terminus of said holey wave-guide, said fill hole adapted to introduce said known selective absorption medium into said plurality of voids” (emphasis added) as claimed. Moreover, by disclosing that openings are formed at the ends of the fibers, Applicant respectfully submits that Levenson teaches away from the claimed embodiments.

Third, Applicant respectfully submits that there is no motivation or suggestion to combine the teachings of Bjarklev and Levenson. As described above, Applicant understands Bjarklev to disclose a wavelength converting waveguide device in which a core defect has an index of refraction lower than the surrounding cladding. In particular, with reference to Figure 4, Bjarklev specifically recites that “the fundamental operation of the device is that the core defect (which has an average index below that of the fundamental space filling mode of the cladding) is modified by an increase of the refractive index of the features containing non-linear material” (emphasis added; col. 15, lines 12-17).

In contrast, Applicant understands Levenson to teach photonic crystal fibers made of transparent material in which “[t]he core region 16 generally has an index of refraction for light of the signal frequency f_1 , greater than the index of refraction of the cladding region 12” (col. 3, lines 6-8). In particular, Applicant respectfully submits that by teaching that the core defect has a lower refractive index than the surrounding cladding, Bjarklev teaches away from combination with Levenson. Therefore, Applicant respectfully submits that there is no motivation or suggestion to combine the teachings

of Bjarklev and Levenson, and that the combination of Bjarklev and Levenson does not satisfy the requirements of a *prima facie* case of obviousness

Applicant respectfully asserts that nowhere does the combination of Bjarklev and Levenson teach, disclose or suggest the present invention as recited in independent Claims 1 and 7, that these claims overcome the rejection under 35 U.S.C. § 103(a), and are thus in condition for allowance. Moreover, Applicant respectfully submits that the combination of Bjarklev and Levenson does not satisfy the requirements of a *prima facie* case of obviousness. Applicant respectfully submits the combination of Bjarklev and Levenson also does not teach or suggest the additional claimed features of the embodiment of the present invention as recited in Claims 8-10 that depend on independent Claim 7. Therefore, Applicant respectfully submits that Claims 8-10 overcome the rejection under 35 U.S.C. § 103(a), and that this claim is thus in a condition for allowance.

CONCLUSION

In light of the above remarks, Applicant respectfully requests reconsideration of the rejected claims. Based on the arguments presented above, Applicant respectfully asserts that Claims 1-10 overcome the rejections of record and, therefore, Applicant respectfully solicits allowance of these Claims. The Examiner is invited to contact Applicant's undersigned representative if the Examiner believes such action would expedite resolution of the present Application.

Respectfully submitted,

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Dated: 12/6, 2006



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